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FIRE MANAGEMENT NOTES

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Prescribed fire was used on the Okanogan National Forest to reduce the fire hazard created by precommercial thinning slash. Our lead story tells of their procedures and success. Our cover picture shows the area 1 year later.

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The Cole Broadcast Burn

James B. Webb[1]

In recent years, the positive aspects of underburning using prescribed fire have been extolled by fire managers. Many of the claims have been perceived as less than credible. Our horizons are perpetually expanding with each proven application of fire as a management tool (Martin and Dell 1978). Credibility is also improving as proof points to success. This article is presented as further evidence of the useful role fire can play in forest management.

Tonasket Example

The use of fire to modify the fire hazard in precommercial thinning slash on the Tonasket Ranger District, Okanogan National Forest, started 5 years ago. Thinned stands composed primarily of ponderosa pine were the first areas to be treated. As results unfolded, the suggested fire tolerance of inland Douglas-fir and western larch led fire managers to contemplate using fire to treat thinning slash in stands heavily populated by these species.

Test Plot

A test plot in the Cole Creek Drainage, Tonasket Ranger District, containing 150 acres was prepared for burning. The plan was to burn a 20-acre plot under a specific prescription. If that prescription looked acceptable, the remaining 130 acres were to be burned within the same general parameters.

Downed fuel inventories on the area indicated discontinuous fuel accumulation (table 1).

Table 1.—Fuel Accumulation—Cole Broadcast Burn

Size Class	Plot 1	Plot 2	Plot 3
	Tons Per Acre		
0-.25″	1.16	.08	9.32
.25-1″	2.28	2.28	9.89
1-3″	4.00	2.00	22.02
3″, sound	23.82	-0-	9.23
3″, rotten	38.77	-0-	-0-
Total	70.03	4.36	50.46

Most of the fuel resulted from thinning 5- to 6-inch d.b.h. Douglas-fir 12 years before. The residual stand consisted of 7- to 8-inch d.b.h., 60 percent Douglas-fir and 40 western larch, on a 12- by 12-foot spacing. Slope averaged 20 percent with a northeast aspect.

The objectives of the burn included:

1. Determine feasibility of treating heavy thinning slash in Douglas-fir-western larch type.
2. Remove 90 percent dead woody material 0- to 3-inch category.
3. Remove 40 percent dead woody material >3-inch category.
4. Improve site preparation for ponderosa pine seed in unstocked openings.
5. Retain the residual stand in vigorous condition.

To accomplish the above objectives the following prescription range was developed:

	From	*To*
Fuelstick moisture, percent	10	22
Relative humidity, percent	25	45
Windspeed, mph	4	10
Wind direction	Northerly	
Temperature, °F	45	65

The Prescribed Fire

The desired weather conditions prevailed for several days in mid-October. We burned the 20-acre test plot with slow backing fires set along numerous interior lines that ran parallel to the contours. The lines were 3 to 5 chains apart. Flame heights seldom exceeded 3 feet and averaged 18 inches. Gusty winds to 10 mph dispersed the smoke and heat well. Temperatures ranged from 45° to 50°F with relative humidity varying from 35 to 45 percent. Fuel moisture sticks held at 11 to 12 percent.

The original 20-acre test plot looked good (fig. 1). On that basis we continued the burn to cover the full 150 acres. All initial impressions seemed to verify our premise that prescribed fire was indeed a viable tool to treat thinning slash in pole-size Douglas-fir and western larch.

Postburn Analysis

Several postburn analyses have been completed. They included visits to the site by a soil scientist, silviculturist, wildlife biologist, ecologist, entomologist, and numerous, miscellaneous interested folks. All objectives were met; 75 percent

[1]District Ranger, Tonasket Ranger District, Okanogan National Forest, USDA Forest Service, Okanogan, Wash.

Figure 1.—A pocket of fuel remaining after the burn was completed gives a good idea of preburn conditions.

of the dead fuel greater than 3 inches in size was consumed. Only 2 percent of the residual stand died after the burn. Insect numbers did increase slightly immediately after the burn. Soil disturbance was lighter than originally predicted. Only 15 percent of the humus layer burned to expose mineral soil.

Because the fall burn consumed considerable amounts of large fuel, we conducted a spring burn under the same prescription on an additional 65 acres. Results were much the same in all but the large logs and stumps. They showed less consumption due obviously to higher spring moisture content.

The most encouraging thing about using fire in this way is the low per-acre cost and environmental compatibility. For $9.56 per acre we were able to accomplish what normally cost $60 per acre to machine pile and $200 per acre to hand pile. Burning actually resulted in less soil disturbance than by either piling process.

Numerous resource management specialists from various disciplines have looked at the Cole prescribed underburn. With few exceptions they are enthusiastic about the opportunity we have to add fire to our management tools in one more situation. Additional applications will surface as fire managers' knowledge increases.

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Smokey Bear Radio

Paul Hart[1]

Two of the newest radio celebrities in central Washington State are friends of Smokey Bear. Their show isn't broadcast very far—a radius of about 5 miles is considered the effective range. It's not likely to be tuned in by anyone but someone driving Highway 410 between the cities of Seattle and Yakima, Wash., (fig. 1), but after its first full recreation season the Smokey Bear network seems to be a rousing success all the same. The broadcast is a 3-minute taped radio message carefully composed and recorded by personnel from the USDA Forest Service's Naches Ranger District of the Wenatchee National Forest.

Figure 1.—This special highway sign was designed to encourage travelers to tune in to Smokey Bear radio.

Background

Broadcasting fire prevention messages over commercial radio stations has been done for years. Fire prevention messages must be general enough to apply to the entire broadcast area, which is usually large. Fire managers have often wished they could aim a message specifically at those people who are using their local area. With the aid of inexpensive, readily available equipment, this wish is becoming a reality.

Process

Even though the station has a minimal range, a special license must be issued from the Federal Communications Commission for operating a radio transmitter. The first and most difficult step was to obtain this license. The license was granted, but the process from start to finish took about a year and a half.

The license request went from the forest to the Forest Service regional office in Portland, and then to the Department of Agriculture representative on the interdepartmental Radio Advisory Committee. That committee in turn submitted the application to the FCC, which granted the license. The transmitter broadcasts on a frequency of 1610 kilocycles, with a maximum output of 10 watts.

Most of the necessary equipment was available from General Services Administration (GSA). It includes a stereo cassette deck for mixing music and voice, headphones, a high-quality microphone, and a voice level control. A small room was soundproofed to serve as a production booth.

Transmission equipment (fig. 2) includes a transmitter, antenna, tape player and eight-track cartridge recorder. The transmitter broadcasts 24 hours a day from a locked metal box inside a fenced area.

The total cost for equipment came to less than $3,000. It took 10 hours

[1]Public Information Officer, Wenatchee National Forest, USDA Forest Service, Wenatchee, Wash.

Figure 2.—Compact equipment includes a tape player, transmitter, and a short antenna. The equipment is located inside a fenced area to discourage vandalism.

for a forest radio technician and his assistant to install the radio transmitter and antenna. One of the more time-consuming parts of the installation was the burying of eight 30-foot-long ground wires which radiate from the base of the transmitter.

Operation

The secret for success of the broadcast has been to offer an interesting, usable message. We wanted a broadcast that people would tune in on, and we figured that the prevention message was not salable by itself. As a result, the broadcasts weave a fire prevention message into general information about recreation, woodcutting, and road conditions. Just the high points are broadcast, and the message is changed at least once a week for variety.

The radio operators follow an at-ease, conversational approach in the broadcast, and subdued music provides a background for their message (fig. 3). The broadcast seems to be well-received by the motoring public.

The transmitter is located at the junction of two main highways. The Washington Department of Transportation contributed a large highway sign that helps approaching motorists find the broadcast on their radio dial. In return, the station broadcasts information on current highway conditions as part of the program.

Technical difficulties of recording and broadcasting the program have been overcome through consultation with others who have used such equipment, primarily the National Park Service of the U.S. Department of the Interior. One early change was to replace 3-minute cassette tapes with 90-minute tapes. This allows their 3-minute message to be recorded 30 times and greatly reduces the wear on the tape as it is repeated throughout the day.

Personnel from the Wenatchee National Forest have written a guide for would-be broadcasters that includes a list of troubleshooting tips. It is available on request from the Naches Ranger Station, 16680 Highway 410, Naches, WA 98937.

The station has been so successful that the Forest is considering adding stations to reach the crowds of visitors who travel to the Forest on other highways.

Figure 3.—Recording takes place in a small soundproof room.

FIRE PREVENTION—ANALYSIS AND EVALUATION

Roland J. Treubig and Brad Nickey[1]

A method has been found that will enable the user to statistically prove the effectiveness of forest fire prevention. The method is soon to be released (Treubig 1980). It uses two quality control methods that make possible the viewing of data to evaluate efforts.

Method

The accompanying flow chart (fig. 1) outlines the basic concept. First, the area within which a test is to be made is selected. The test is to compare special prevention efforts with regular efforts. That area excluded from the test remains as a control. For both, individual fire reports are summarized by Julian weeks[2] and put through the control chart method (Grant 1952). The method allows the user to sort out the assignable causes of variation beyond the established control limits. Positive assignable cause plot points could be due to high fire occurrence. Negative assignable cause plot points could be due to prevention efforts. Additionally, the method will enable the user to statistically divide the year into time groups based on fire incidence.

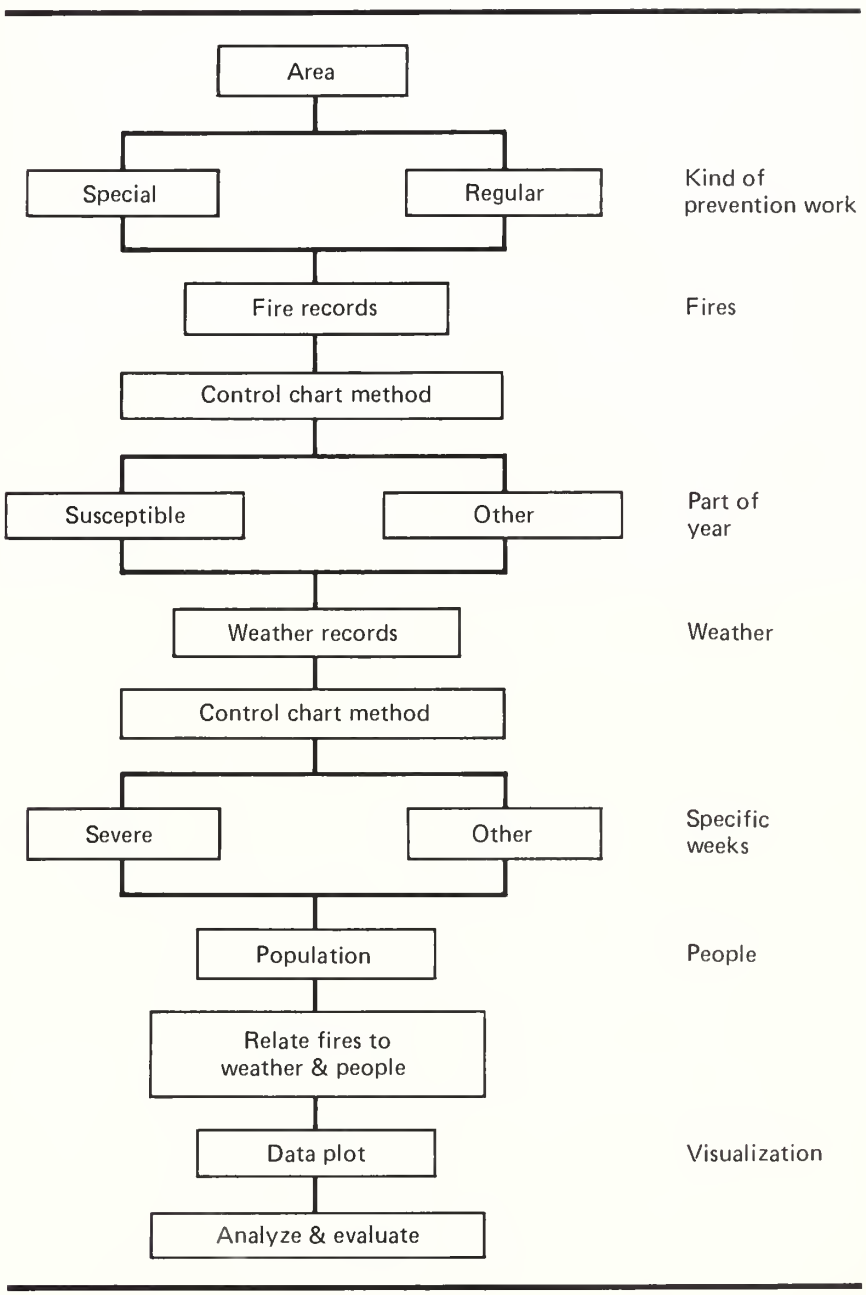

Figure 1.—Fire prevention analysis and evaluation flow chart.

[1]Respectively—Staff Forester, Prevention, Louisiana Department of Natural Resources, Office of Forestry, Alexander State Forest, Woodworth, and Research Scientist, Forest Fire Laboratory, Pacific Southwest Forest and Range Experiment Station, USDA Forest Service, Riverside, Calif.

[2]Julian weeks are 7-day periods, numbered sequentially starting with the first day of the year. Thus, Julian week 1 is January 1 through January 7; Julian week 3 is January 15 through January 21.

By this means the yearly data are split into those which are most "susceptible" to prevention efforts and the balance, or "other" weeks. Susceptible is defined as that part of the year during which any reduction in number of fires should be most evident.

Next, fire weather records showing spread index and buildup index for the susceptible weeks are put through the control chart method. These weeks are then divided into those which encompass the severe conditions and the balance. Severe fire weather is a judgment call based on factors common through all the years and usually exceeding the control chart's upper limits.

At this point, population data are introduced. Care is needed to insure that the census data are prorated reasonably. Projection beyond the last census must be handled with extreme care. Economic planning districts have estimated populations that have been "revised" by year and that can be used for this purpose.

Knowing number of fires, susceptible time, severe fire weather weeks, and population, one can determine the number of fires per thousand people for the several time units. At this point, viewing can begin. An assist will be found in the scale values as detailed in Ewan (1963). With the graphic presentation, the visual impact becomes evident to anyone with an interest in the prevention work.

Analysis and Evaluation

This method was used to analyze and evaluate "special" versus "regular" prevention efforts in Livingston Parish (County), La. "Special" efforts were concentrated in 5 of the 16 townships in the parish with a history of severe fire occurrence. Upon completion of the analysis, success and failure could be seen.

The local forest fire law enforcement agent was able to explain each success or failure. He noted one particular township where the line slope headed back up after several years of downslope (see figure 2). In this case, one landowner had been the prime cooperator in a prescribed burning program. When the price of cattle took an adverse turn, he went out of the cattle business. Because of his lack of interest in prescribed fire, his neighbors became active in wildfire setting, accounting for the upslope. Two other townships also showed upslope trends because the agent had to leave work there and go to another area in which a critical situation developed. There were continued downslopes in two townships after several woodsburners were arrested.

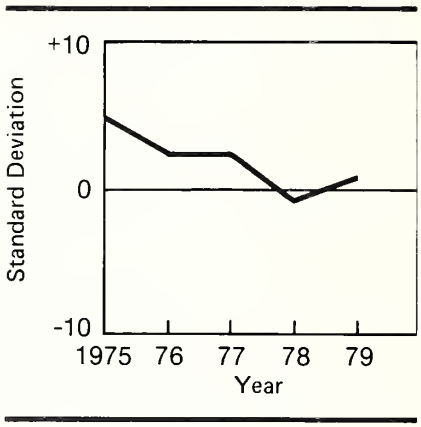

Figure 2.—Fires per 10,000 population, severe fire weather weeks, period of Julian weeks 2--15, 1975--79, T8S R5E, Livingston Parish, La.

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What Is the Rural Fire Problem?

Roy G. Hatcher[1]

A major concern of a rural fire department is to know what the fire problem is in its fire district. In order for a department to know what the fire problem is, it must develop a systematic method of fire reporting and recordkeeping. Statewide fire organizations, too, must have accurate fire history data if they are to cope with the fire problem on a statewide basis (fig. 1).

In Iowa the State Forestry Department does not have forest fire suppression crews primarily because it is not a heavily forested State. Total reliance for protection of the rural wildlands is with the Iowa fire services, even though the State forestry department is responsible for the control of the wildfire problem.

Figure 1.—Accurate and timely fire reports are the basis for fire protection programs.

Past Deficiencies

Since the late 1950's, the Iowa Forestry Department has been collecting wildfire reporting data from the Iowa Fire Service on a voluntary basis. However, this system has not produced valid statistics on which to make an analysis of the wildfire problem for better fire protection. Some of the causes of wildfire were known, but there was no valid information on how many acres were burned and what the damage and loss were. In 1975, it was decided to conduct a 10-percent random sample survey of the 900 fire departments in Iowa. The sample asked two questions: (1) How many wildfires did you have for a 12-month period? and (2) How much acreage was burned? This information was physically gathered by field personnel and then compared to the same period covered by the regular postcard fire reports. Since past reports gave the causes, this information was applied to the survey information, and it was found that less than 10 percent of all wildfires occurring were being reported.

In 1976, a second survey was conducted with similar results. In checking with other State forest fire supervisors, it was found that Iowa's problem was not unique. In order to develop a better statewide wildfire plan and prevention program, a better method of reporting was needed.

Statewide Plan

For the past 2 years the Iowa Forestry Department has been working with Fire Service Extension at Iowa State University on a statewide wildfire plan. In conjunction with this project, Fire Extension received a special grant from the Forest Service to study fire reporting in Iowa. This study is currently being completed. It will hopefully give some insight into why fire departments, particularly in rural areas, are not reporting their wildfires.

One of the most positive results of this study has been the development

[1]Protection Forester, Iowa Conservation Commission, Des Moines, Iowa.

of a fire department activity log. In earlier surveys, it was discovered that many fire departments kept very poor records of their fire calls and some smaller departments had no records. This activity log is a simple and easy-to-fill-out report. It covers all activity of the fire department, including not only fire runs but also training, maintenance, and prevention programs. An entry is made whenever a fire unit is moved. The log is designed with a tear-sheet that is sent every month into the Fire Service Extension Office, where it is fed into a computer. The information gathered in the log can be broken down by activities of the entire State, county, and individual department. The computer program will print out a graph showing the day of the week and time of day of the greatest activity. Firefighter-hours per activity can be retrieved. These are just some of the various types of information that can be retrieved by this system. The information will be quite valuable for developing fire prevention activities and budgets. Soon, forestry department personnel should be able to look at all fire activity throughout Iowa at a glance. Of course, this is still a voluntary report, but so far the acceptance by the fire service has been excellent, and the activity log is now being distributed statewide.

Develop Reporting Service

Iowa received a grant 2 years ago through the State fire marshal from the United States Fire Administration (formerly NFPCA) to develop an instant fire reporting service that could be plugged into a national fire reporting service that would be computerized. The original report model was not developed to accommodate all the wildfire information needed by those involved in the wildfire problem. With assistance from the State of South Dakota an add-on portion to the National Instant Fire Report was developed to include needed wildfire information. Earlier, South Dakota had developed a similar report from a national standard setup by the Forest Service. Iowa implemented this instant fire reporting system on April 1, 1979, as the fire report required of all fire departments in the State of Iowa. This report is based on the 901 coding of NFPA and is more complicated than the fire activity log. However, one item requested that is not called for in the log is fire damage loss. This item is a very difficult one to get, and guidelines still need to be revised.

Summary

If Iowa is ever going to get a realistic overview of the rural fire problem, the Conservation Commission will have to develop a fire reporting system that the Fire Service will accept. A reporting system must be developed that can be utilized nationally as well as locally and statewide if our rural wildfire problem is to be identified.

Reporting—The Dilemma of Rural Fire Protection

Ames Harrison[1]

Over 42 percent of the Nation's population lives in rural[2] America. Damage to human lives and property in rural areas from fire occurs at a rate of three to six times the rate in urban areas.

The people in these rural areas are protected by over 50,000 rural fire departments (fig. 1) served by over 1 million volunteer firefighters (fig. 2). These firemen are some of the finest people in the world—giving their time, energy, and often lives to provide protection to citizens of rural America. For most of these departments, records and reports have been a secondary duty, worked on only after the fires are out and the equipment is back and ready to go. It's an insignificant-seeming part of the job to tired men who are headed back to their primary job—"putting the fires out" to protect the citizens in their areas of responsibility.

Figure 1.—Just 1 of the 50,000 rural fire departments.

Poor Records

As a result, fire reports are often poorly prepared or totally nonexistent. This means that there is very limited information on the fire protection situation in rural areas. The number of fire reports filed ranges

Figure 2.—Over 1 million volunteer firefighters protect rural property and lives.

[1]Rural Community Fire Protection Specialist for the USDA Forest Service's Northeastern Area State and Private Forestry, office in Broomall, Pa., when this report was prepared. Now Fire Prevention Specialist, USDA Forest Service Cooperative Fire Protection Staff, Washington, D.C.

[2]Rural includes any city or town with a population of fewer than 10,000 inhabitants and areas outside these cities or towns with population density of fewer than 100 persons per square mile.

from 10 to 80 percent of the total incidents in the 20 Northeastern States. In many cases, the reports that are received are incomplete and of limited value in determining the cause of fires or for building a fire prevention program.

Accurate and timely reporting of fires and the circumstances concerning them is necessary to determine equipment and training needs and as a basis for building a fire prevention program.

The dilemma of rural fire protection comes from expecting regular, accurate reporting from an already busy volunteer. However, the problem of obtaining information concerning fire protection in rural America that can be used as a basis for protection programs and financial assistance *must* be solved.

At present there are a number of programs being carried out throughout the United States in an effort to obtain the badly needed rural fire statistics. These programs involve the NFPA, USDA Forest Service, State foresters, State fire marshals, and volunteer fire organizations.

Three of these programs having potential for supplying some of the badly needed rural data are:

Basic Fire Incident Report

The Fire Prevention Working Team of the National Wildfire Coordinating Group has developed a one-page sheet to supplement the Basic Field Incident Report (901F). The sheet is keyed to the coding used for the basic form and uses a building block concept for determination of cause. The form was developed through an analysis of wildfire reports used nationwide. It calls for information lacking in these reports.

The committee that developed the supplement represented the State foresters, USDA Forest Service, and rural fire companies. An employee of the Ohio Division of Forestry acted as chairman. The chairman met regularly with the NFPA 901 Committee to coordinate development of the supplement with the 1981 planned revision of the Basic Field Incident Report.

One of the goals of the committee was to limit the supplement to one sheet and in no way lengthen already existing reports.

The supplemental form was used during the spring of 1979 on a test basis in some units in the States of New Hampshire, Minnesota, Missouri, Alabama, and Texas; in a Forest Service Ranger District in California; and in a BLM District in that State. The reporters were the people normally responsible for filling out fire reports and included rural volunteer firemen, district forest rangers, and clerical personnel. Each of the individuals prepared a critique. An analysis of the reports and critiques is presently being made. The result, it is hoped, will be a usable and easily completed supplement to the 1981 revised 901F, the Basic Field Incident Report, which will normally be completed by the rural fire department after each incident.

For the wildland fire protection agencies the added data should provide valuable information on fire cause and, more importantly, data upon which to build a fire prevention program.

Research Triangle Institute Study

The Forest Service contracted with the Research Triangle Institute (RTI) in North Carolina to gather a statistical sample of the status of America's rural fire companies. The objective of the RTI study is to obtain accurate information on randomly selected rural fire departments, expand this information nationally, and use this as a basic data bank for information on rural departments.

The additional data gathered through field fire reports would support and enlarge upon the RTI study. This information is to be expanded statistically to give a view of the rural fire situation nationally.

Iowa's Fire Log

For a detailed discussion of Iowa's fire department activity log see the article "What Is the Rural Fire Problem?", starting on page 9 of this issue.

In conclusion, the dilemma of rural fire protection is still with us, but there are a number of positive, effective efforts underway to solve it, with the goal of making rural America safer for its residents.

SOME LAW ENFORCEMENT ROLES IN WILDLAND FIRE PREVENTION IN THE 1980's

Ernest V. Andersen[1]

During the past 10 years, more than 90 percent of all wildland fires reported in the United States were caused by people. Based on *1969–1978 Wildfire Statistics* (an annual report published by the USDA Forest Service's Cooperative Fire Prevention staff), more than 1,700,000 fires were caused by people during the 1970's and more than 7,900,000 acres of wildland vegetation were burned as a result of arson. An additional 7,800,000 acres were reported as burned when people unintentionally and/or nonmaliciously caused the fires. Lightning was reported to be the cause of fires that burned across 4,300,000 acres.

Many wildland managers are now in agreement that using acreage burned as a primary measure of the success of a fire management program is irrational. Infusion of cost/benefit criteria and the maturation and application of processes by which cost-plus-loss data are developed have resulted in questions about many of the fire management practices and policies of the 1970's. The logic that set a maximum number or "par" as an objective for fires caused by people is equally worthy of examination. In an atmosphere of economic accountability, it is probably irrational to establish an objective of elimination of all fires caused by people in any large tract of wildland. The traditional role of law enforcement in wildland fire prevention has been to deal with the program failures (fig. 1).

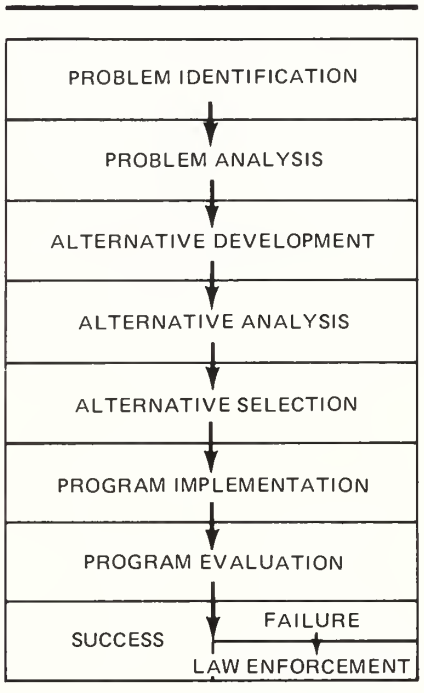

Figure 1.—Traditional linear model of development of a fire prevention program. Note the "failure role" assigned to law enforcement.

First Things First

During the 1970's, less than 3 percent of all fires resulted in more than 90 percent of the acreage burned. Since large fires are usually associated with high fire intensities, probably most of the net damage associated with wildland fires also occurred on these large fires. Perhaps, nearly all of the net negative resource value change occurred as a result of only 3 percent of the fires. A case can be developed to design a fire prevention program to prevent the 3 or so percent of the fire starts which result in large acreage burned.

The first step in developing a fire prevention program designed to minimize damage is thorough, professional investigation of the cause of fires. Individuals who make initial attack must be trained to identify and protect the general point of origin of each fire that was or may have been caused by people. People with highly

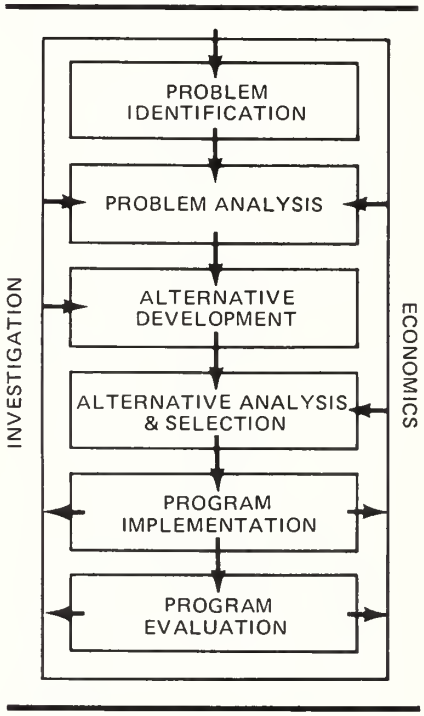

Figure 2.—Suggested interactive fire prevention program model recognizing roles of law enforcement in the 1980's.

[1]Group Leader, Law Enforcement, USDA Forest Service, Washington, D.C.

developed skills in investigating the specific cause of a given fire must also be available. Their fire prevention and law enforcement role is to establish the who, when, where, how, and what elements for a comprehensive fire prevention program. Thus, investigation can be the cornerstone of an effective, efficient fire prevention program (fig. 2).

Analysis Next Step

In areas of mixed ownership, an interagency approach to analyzing the data developed from investigations is the next step. During the analysis step, the resource-damage consequences of each type of cause must be correlated with time of year, time of day, burning conditions, and other factors. The role of law enforcement specialists in this step is to advise managers of the reliability of investigative results.

As alternatives are developed, law enforcement specialists have a role of advising decisionmakers of the feasibility and probability of success in eliminating fires by specifie causes. Law enforcement specialists can also provide advice on the applicability of laws and regulations. They ean also advise on how laws and regulations are being interpreted by the courts. Using this input along with that of other specialists, managers can develop a wide array of alternatives that are targeted at preventing those fires that are most likely to cause significant resource damage. Fire prevention program specific elements ean be selected based on their probability of success and on resource losses prevented. Economie and personnel resources required can be measured against the probability of success of each alternative. Expenditures can be targeted and concentrated on those specific causes, locations, and times that would result in large negative resource value changes rather than targeted at preventing numbers of fires.

Final Law Enforcement Roles

When a fire prevention strategy has been selected and implemented, law enforcement specialists can play continuing key roles. Continuing thorough investigation provides the basic information to use the courts as a deterrent and as a mechanism to recover costs and losses associated with a given fire and in programs targeted at reducing arson. Investigation also provides the information necessary to evaluate the success of the fire prevention program in terms of the objectives the decisionmaker has set.

Investigation can also identify new trends and the results of demographic changes. The consequences of new industrial technology and population changes can be currently assessed. Basic investigation and inclusion of law enforcement skills can help design more effective and efficient fire prevention programs in the 1980's.

DATA BASE APPROACH TO CURRENT LISTING OF APPROVED AIRCRAFT AND PILOTS

E.L. CORPE
and JOHN R. ALLEN[1]

In June 1977 the Southern Region of the USDA Forest Service in Atlanta developed a data base system for certification and recording of Forest Service aircraft and pilots. The conventional manual method of filling out forms, filing, and mailing was inadequate and time consuming. The system developed to deliver needed data would be faster, more accurate, and less costly.

Old System

The old system consisted of a Forest Service check pilot's inspecting and approving an aircraft or pilot, then submitting the forms to the regional office, there reviewing, correcting, duplicating, and mailing the resulting lists to field units for them to update their records before ordering aircraft services. This process often required up to 30 days. In many cases the aircraft were sold or the pilots moved by the time a contemplated use resulted in review of the approved list. In actual practice, because of its awkwardness, the old system was updated only twice a year.

System Developed

The data base system was set upon the USDA Forest Service's system 2000 software located at Fort Collins Computer Center in Colorado. After agreement on the format of outputs, a preliminary system was developed and a "cut and try" approach was used to make improvements or additions until the system was fully operational for use by the Southern Region.

System Access

In actual operation the system can be accessed from any computer terminal. Control of input and revision is maintained at a single point (regional dispatcher's office). Examples of information available through the system include aircraft manufacturer, type of aircraft, speed, passenger capacity, owner, including contact phone numbers, mission qualifications, fuel capacity and range, useful load, cost per hour, and expiration date of approvals. Currently the system includes commuter airlines by name, State served, and primary base. It also has the capability to accept aircraft and pilots of other Federal and State agencies when we need to include this information.

Information Display

Display of information in the system can be delivered inexpensively to any unit with access to Fort Collins Computer Center (FCCC) (through ICL high speed terminals or Teletype 43 slow speed terminals). To avoid the "overkill" problem of receiving more information than needed or wanted, provision was made for specific breakdowns of data as follows:

- All aircraft (or pilots) and data pertaining to those available or approved on a general geographical area basis. The Southern Region is administratively divided into west, central, and east zones.
- All aircraft or pilots available or approved on a particular National Forest or State basis.
- Abbreviated versions include only pilots or aircraft on the same Forest or zone basis.
- Data on an ad hoc basis, that is, giving a printout of aircraft by mission or by type, such as airplane (single engine or multi-engine) or helicopter, or by number-of-passengers capability, or by speed or range in miles.
- Pilots by mission qualification or by Forest, State, geographical region, or employer.
- Printouts showing pilots whose approval expires within a specified time period.

The Definition Tree (see fig. 1) shows the data base design. Major categories in the data organization are pilot, aircraft, operator, commuter airline, and accident/incident. Each of these major categories is subdivided into a range of 4 to 28 data elements.

The original idea was to include data on airports. Review and experience indicated this section could be eliminated. For security and confi-

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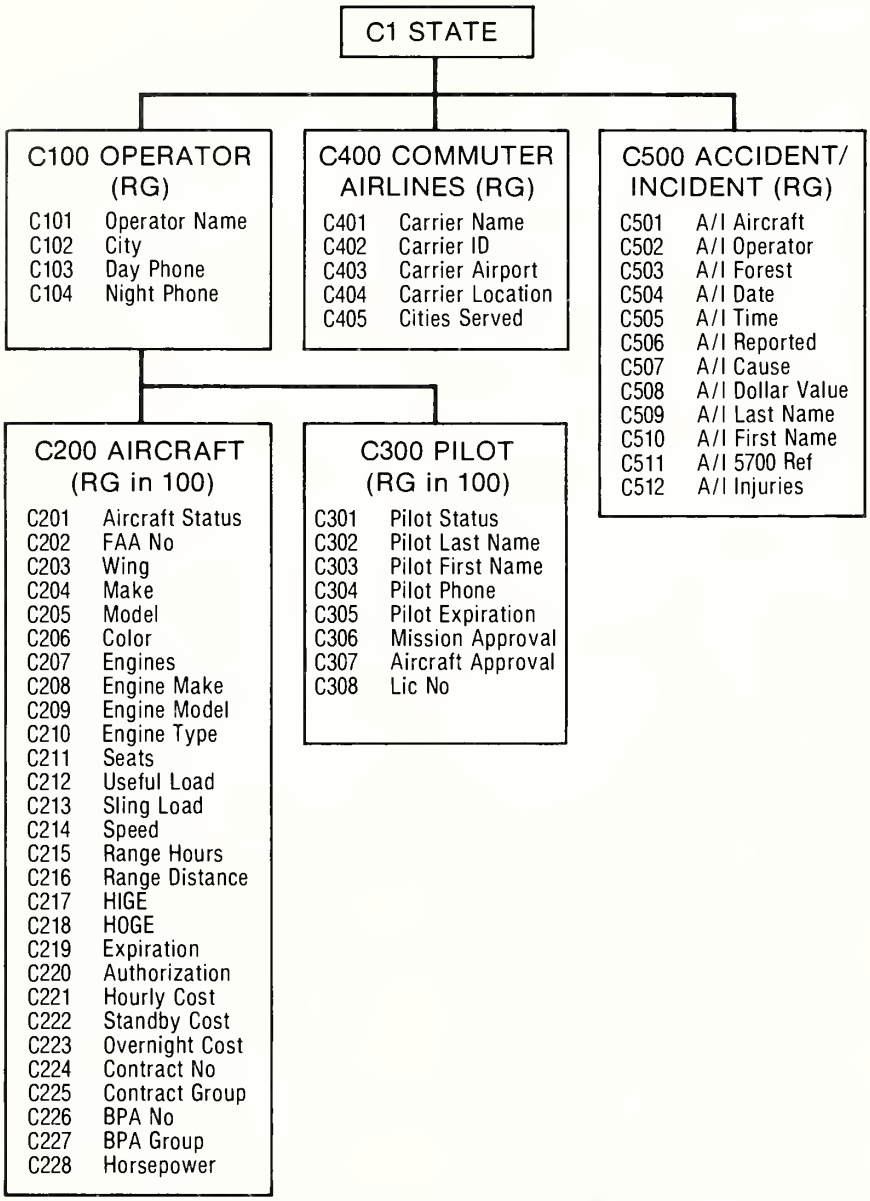

Figure 1.—Definition Tree, showing data base design.

dentiality, the accident/incident data are restricted. Available expertise and time have been invested to make the system workable for storage, display, and updating of basic data on pilots and aircraft.

System Operation

Operation of the system is best explained by figure 2, which shows a comparison of information flow under the old manual system and the computerized data base approach. Pilots and aircraft, when approved by inspectors, are entered on the forms which are sent to the regional office as in the past. Both original file creation and updating are accomplished in the same manner by transcribing the original approved forms filled out by check pilots in the field. To date, most of this has been additions to the data base; withdrawal of approval can be reflected in the data base by a similar revision. The data are entered in the Fort Collins computer on a batch or interactive basis. This information is available immediately to anyone needing it via computer terminal printout.

At one point the possibility of combining this system with another one needed to store, display, and revise data on Forest Service aircraft destination, schedules, and seats open was considered. The two systems have been kept separate for two reasons:

1. The control and approval of aircraft and pilots favor input from a central location only. The aircraft destination and schedule program needs multiple location input and revision.
2. FCCC-based operation is not suitable for the aircraft destination scheduling because access to FCCC is not available on Saturdays and Sundays and scheduling covers 7-day-a-week operation.

Summary

Regional office and field users of the system during the pilot test period from August 1, 1979, to March 15, 1980, agree that the data base will furnish more accurate information, in much less time, much more conveniently, and at lower cost than the manual system formerly used.

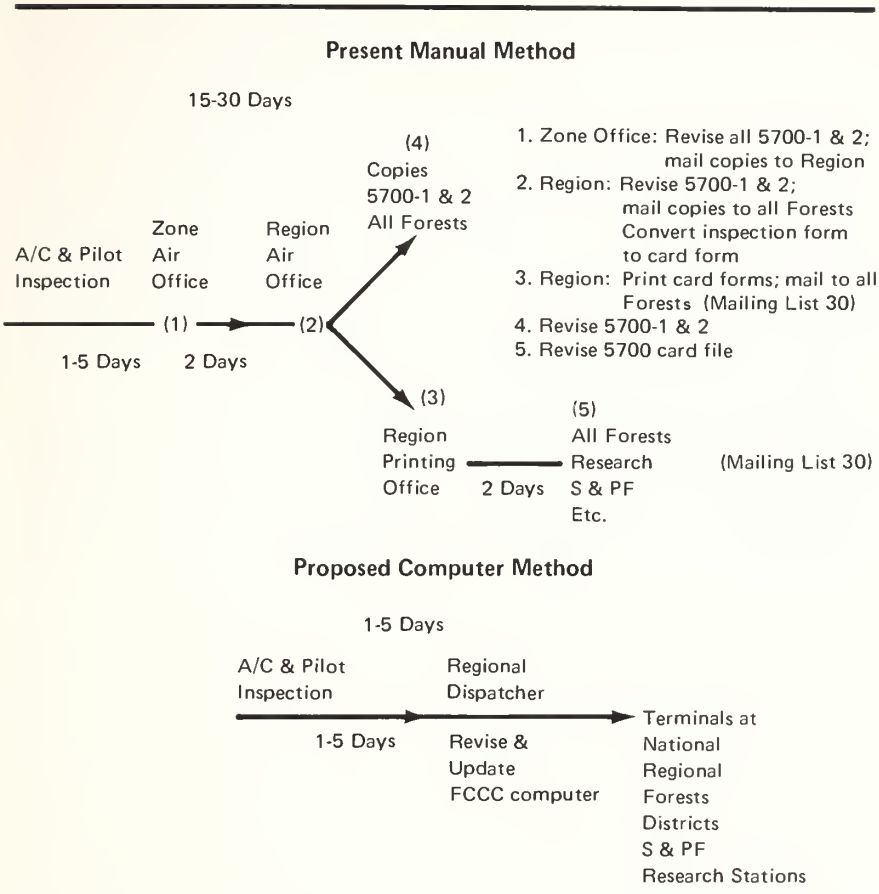

Figure 2.—Present manual method and proposed computer method of pilot and aircraft inspection procedures, Southern Region.

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